AGENDA ITEM E-4

CITY OF LODI
COUNCIL COMMUNICATION

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AGENDA TITLE: Approve specifications and authorize advertisement for bids for 40,000 feet of #1/0 15kV underground cable (EUD)

MEETING DATE: September 15, 2004

PREPARED BY: Electric Utility Director

RECOMMENDED ACTION: That the City Council approve the specifications and authorize advertisement for bids for 40,000 feet of #1/0 medium-voltage concentric-neutral EPR-insulated underground electric cable.

BACKGROUND INFORMATION: Last year, the Electric Utility Department solicited bids on several sizes of underground electric cable with a new type of insulation, ethylene-propylene rubber (EPR). Industry tests had shown that EPR insulation yielded longer cable life and resulted in fewer cable failures, while department evaluations showed EPR cable could be installed more efficiently than conductor with cross-linked insulation. Additionally, conversion to EPR cable allowed the Department to replace two sizes (#2 and #2/0) in cross-linked conductor with one size (#1/0) in EPR.

This cable will be needed for installation in new subdivisions beginning early next year.

FUNDING: Electric Utility Department 2003-2005 Financial Plan and Budget,
Line Extensions, Business Unit 161651, Page E-41
Estimated Cost: $60,000

BID OPENING: October 13, 2004

Alan N Vallow, Electric Utility Director

Attachment: Specifications
Prepared by Joel Harris, Purchasing Officer

cc: Manager, EUD Engineering and Operations

APPROVED: _____
Janet S. Keeter, Interim City Manager

City of Lodi

15 kV, EPR INSULATED CONCENTRIC NEUTRAL CABLE

September 2004

1.0 GENERAL

Cable furnished under these specifications shall be limited to 15 kV single conductor URD cable, stranded aluminum conductor, filled strand, extruded insulating system consisting of a conductor shield, insulation, semi-conducting insulation shield, bare copper concentric neutral and encapsulating jacket. The cable shall be designed for installation in conduits or for direct burial in earth, in wet or dry locations as well as outdoor locations exposed to weather and sunlight. Cable furnished shall meet the requirements of the applicable NEMA, ICEA, AEIC and ASTM Standards, latest edition thereof, unless otherwise noted in this specification. The insulation shall be ethylene-propylene rubber (EPR) suitable for operation at 105 degree C continuous and 140 degree C emergency, as specified.

2.0 CONDUCTOR

The insulated conductor shall be Class B, stranded or compressed strand 1350 aluminum alloy, three-quarter hard meeting the requirements of ASTM B231/B231M, B609/B609M. Conductor size will be listed on the proposal forms (bid sheets).

3.0 STRAND FILLING COMPOUND

In order to prevent water propagation through the conductor a strand filling compound shall completely fill the voids between the conductor's inner strand layer(s). The compound used shall be flexible and stable under the operating conditions imposed on the cable and as specified herein, and compatible with the conductor, strand shield and insulation.

The outer surface of the conductor shall be free from the filling compound such that splices and terminations can be readily applied using standard compression-type connectors and utilizing the same techniques as for unfilled conductors.

4.0 CONDUCTOR SHIELD

The conductor (strand) shielding shall be a black extruded thermosetting material meeting the requirements of ICEA S-94-649 and AEIC CS8. The material shall be compatible with overlying insulation and the conductor metal and be free stripping from the stranded conductor. The outer surface of the conductor shield shall be cylindrical and shall be firmly bonded to the overlaying insulation.

5.0 INSULATION

The insulation shall be a premium quality red colored flexible thermosetting dielectric based on an ethylene propylene rubber (EPR) elastomer and meeting the requirements of ICEA S-94-649 and AEIC CS8. The insulation shall be compatible with both the conductor shield and the insulation shield. The insulation shall be nominal 220 mils (133%).

6.0 INSULATION SHIELD

The insulation shield shall be an extruded semi-conducting material compatible with the insulation and the overlying metallic shield. The insulation shield compound and thickness shall be in conformance with ICEA S-94-649 and AEIC CS8.

No cleaning shall be required upon stripping the semi-conducting layer if splicing or terminating immediately follows the stripping process.

7.0 CONSTRUCTION METHOD

Conductor shield, insulation and insulation shield shall be installed on the conductor in a continuous process, i.e. single pass controlled environment, utilizing either the triple tandem extrusion method, the dual tandem extrusion method or the true triple extrusion method.

8.0 CONCENTRIC NEUTRAL

The concentric neutral conductor shall be a number of round, annealed, bare copper wires helically wrapped around the cable. The wires shall be spaced equidistant from each other around the circumference of the cable with a length of lay to be not less than 6 or more than 10 times the cable diameter.

The size of the neutral wires shall be in the range of #14 to #10 AWG.

The number of neutral wires shall be sufficient to yield "FULL NEUTRAL" and "1/3 NEUTRAL" as specified on the proposal sheet, except for the 1100 kcmil, 25 kV cable per PG&E specifications.

9.0 ENCAPSULATING JACKET

An extruded nonconductive material, suitable for exposure to sunlight, shall be applied over the concentric neutral wires in accordance with ICEA S-94-649 and AEIC CS8. The jacket shall be compatible with the overall cable system. The jacket compound material shall not limit the rated operating temperature of the cable system (105 degree C).

The jacket shall encapsulate all neutral wires, i.e. be of the extruded-to-fill jacket type.

10.0 MARKINGS

The encapsulating jacket shall be marked by means of surface or indent print with the following information at regular intervals with no more than 6 inches of unmarked space between cable identification, with the following information:

1. Manufacturer's identification or trade name.
2. Size of conductor
3. Conductor material.
4. Type of insulation.
5. Voltage rating.
6. Nominal insulation thickness
7. Year of manufacture.
8 National Electric Safety Code "Lightning Bolt" symbol.
9. Footage markings in two foot increments.
   (Beginning and ending footage numbers shall be indicated on a durable label attached to a flange of the reel).

11.0 TESTING AND GUARANTEE

Testing of cable shall be performed according to procedures set forth by ICEA, AEIC CS-8 and ASTM Standards. Certified copies of pass/fail test results shall be supplied. Any cable found defective either upon inspection, testing or installation will be returned at the manufacturer's expense.

12.0 SPECIFIC REQUIREMENTS

Any conditional bid such as "subject to availability in stock" will be considered non responsive and will be rejected. Cable shall be furnished according to Table 1 below:

Table 1

Conductor Size AWG or kcmil (No. of Strands)	Conc. Neutral Size	Material Phase (Neutral)	Insulation Thickness (mils) Nominal	Reel Dimensions (Dia. Trav. Drum)
#1/0(19)	Full Neut.	Alum. (Cu.)	220	58-32-28
#4/0 (19)	1/3 Neut.	Alum. (Cu.)	220	58-32-28
750 (61)	1/3 Neut.	Alum. (Cu.)	220	78-48-42
1100 (61)*	1/6± Neut.	Alum. (Cu.)	260	78-48-42

- Per PG&E Specification for 1100 kcmil 25 kV cable

NOTE: Refer to proposal forms (bid sheets) for specific sizes and quantities.

13.0 REELS

Reels

Shall be “Heavy Duty Reuseable Wood Reels - Class 2” meeting NEMA Standards Publication No. WC 26-2000 and EEMAC Standards Publication 201-2000, or latest revision thereof. See Table 2 below:

Table 2
Heavy Duty Reuseable Wood Reels – Class 2

Reel Dimensions (Dia. Trav. Drum)(“)		58 - 32 - 28	78 - 48 - 42
Min. Flange Thickness (“)		2.125	3.00
Max. Overall Width (“)		39.50	56.00
Arbor Hole Diameter (“)		3.06	3.06
Min. Stave Thickness (“)		1.250	1.375
Drive Pin	Qty	2	2
	Dia. (“)	1.50	3.00
	Radius (“)	10.0	11.5
Test Hole (“)		3.0	4.5
Bushing or Plate		see note “d”	Yes
Tie Rods (No. & Size)		6 x 3/8”	8 x 5/8”
Assembly Washers (“)		2.5	3.0
Min. # Of Nail Rings		5	6

Notes

a. Washers are required on all bolts. Cup washers are permitted where gross weight is not in excess of 6000 pounds. Flat washers to be a minimum diameter of 3” with a minimum thickness of .125”.
b. Tapered cable test holes are required.
c. Headed nails are to be used, spaced 3 inches apart with a minimum countersink of 1/16” on the cable side and a 1/8” clinch on the opposite side.
d. Metal bushings are required when gross weight is in excess of 2500 lbs.

2. Makeup and length:

Reels shall be shipped with cable to their full maximum cable capacity.
#1/0 and #4/0 AWG shall be shipped on 58-32-28 reels.
750 and 1100 kcmil shall be shipped on 78-48-42 reels.
Alternate reel sizes may be considered. However, a proposal with reels exceeding the maximum flange diameters of 78" or 58" and traverse width of 48" and 32", respectively, will be considered non responsive and will be rejected.

3. Packaging:

Reel covering shall be per WC 26-2000, EEMAC 201-2000, minimum, as follows: "Level 2: Weather Protected" for:

Shipments where the cable is loaded at the manufacturer's point of shipment, in a manner satisfactory to the manufacturer, and without transfer of carrier in-route, i.e. no unloading and reloading, to the point of receipt in Lodi CA.

"Level 5: Export" for:

Shipments where the cable will be transferred in-route or for shipments originating overseas. Containerized shipments will not exclude the requirement for lagging.

4. Marking:

Each reel shall be marked with two durable labels securely attached to each flange of the reel and plainly marked and stating:

a. Destination.
b. Purchaser's purchase order number.
c. Shipping length of cable on reel.
d. Weight of reel (tare weight).
e. Weight of cable on reel.
f. Type and size of conductor.
g. Insulation type and thickness.
h. Voltage rating.
i. Manufacturer's identification number
j. Beginning and ending footage numbers of cable on the reel.

14.0 SHIPPING

Cable ends shall be adequately sealed with a water seal type material and heat shrinkable end caps to prevent the ingress of moisture into the cable ends. Reels shall be shipped upright. All shipments shall be prepaid, F.O.B. Lodi, California.

15.0 MATERIAL SAFETY DATA SHEETS

Material Safety Data Sheets, for specific cable components which are considered hazardous, shall accompany each order. Three (3) copies shall be supplied at time of delivery.

16.0 MANUFACTURER'S CERTIFICATION

The Bidder/Supplier must provide manufacturer's certification indicating:

1. The cable meets the specifications.
2. The cable is of recent manufacture (less than 3 months).

17.0 OTHER REQUIREMENTS

Bidders that have not previously supplied the City EPR 15 kV cable shall meet the following minimum requirements and show proof of same with the proposal:

1. Reference a minimum of five United States electric utilities with at least 100,000 feet of cable with the same insulating material in service for a minimum of 10 years. Include contact persons and phone numbers.
2. The successful cable manufacturer shall have a minimum of 15 years proven and successful experience with the manufacture of EPR insulated 15 kV cable.

18.0 WARRANTY

The EPR cable shall carry a forty-year warranty, by the manufacturer, after receipt in Lodi.